

Amendment Under 37 C.F.R. § 1.111
U.S. Application No. 10/643,968

Atty. Docket No. Q76952

AMENDMENTS TO THE DRAWINGS

Submitted herewith please find one (1) replacement drawing sheet (FIG. 2) in compliance with 37 C.F.R. § 1.84. The examiner is respectfully requested to acknowledge receipt of the drawing.

The submitted drawing sheet is intended to replace the drawing sheet (FIG. 2) previously submitted with the Preliminary Amendment filed August 20, 2003.

Attachment: One (1) Replacement Sheet (containing FIG. 2)

REMARKS

Claims 1-40 are all the claims pending in the application.

The replacement drawing sheet containing FIG. 2 is intended to replace the drawing sheet containing FIG. 2 previously submitted with the Preliminary Amendment filed August 20, 2003. The replacement drawing sheet is supported by the description at, for example, page 8, lines 21-23, and page 11, lines 3-4, of the specification. No new matter has been added.

I. RESPONSE TO EXAMINER'S REJECTION UNDER 35 U.S.C. § 112

Referring to Section No. 2 at page 2 of the Office Action, Claims 3, 5, 15-20, and 26-34 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

In response, Applicants have made non-narrowing amendments to the claims in order to provide antecedent basis for certain terms recited in the claims (as requested by the examiner) and, more generally, to place the claims in better form for U.S. practice. No new matter has been added.

Withdrawal of the §112 rejection is requested.

II. RESPONSE TO OBJECTION TO THE SPECIFICATION

The examiner objects to the term "US\$" at page 2, line 17, of the specification.

In response, Applicants traverse the objection and point out that "US\$" is a well-known abbreviation for United States dollars.

III. RESPONSE TO EXAMINER'S REJECTION UNDER 35 U.S.C. § 103

Referring to Section No. 5 at pages 3-7 of the Office Action, Claims 1 and 3-40 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,500,423 (“Krug”) in view of U.S. Patent No. 7,022,221 (“Hedrick ‘221”) and in view of U.S. Patent No. 4,933,150 (“Haddad”).

Applicants respectfully traverse the present §103 rejection.

Claim 1 is directed to an apparatus for stripping hydrocarbons from fluidized solid particles counter-currently with a gaseous stripping fluid. The apparatus of Claim 1 is part of a separator vessel. A feature of Claim 1 is that the apparatus comprises several pairs of segmented, parallel baffles arranged in rows. A representative example of the feature of Claim 1 of “several pairs of segmented, parallel baffles arranged in rows” is provided by the non-limiting illustrations of present FIGS. 1A-1C, showing an embodiment having parallel baffle plates (1a, 1 b; first pair) of the disk-type followed by parallel baffle plates (2a, 2b; second pair) of the donut-type. The other pending independent claim (Claim 37) likewise recites “a series of sets of at least two parallel, segmented, baffle plates each.”

The combination of Krug in view of Hedrick ‘221 and in view of Haddad does not teach or suggest at least the “several pairs of segmented, parallel baffles arranged in rows” feature of Claim 1. In this regard, Krug does not teach pairs of parallel baffles arranged in rows in a stripping zone. Instead, Krug teaches single riser-supported ring baffles 75 and single doughnut baffles 77 arranged in order to prevent the catalyst from falling straight. At column 9 lines 35-49, Krug describes its baffles arrangement in the stripper as providing the axial spacing between

the wall and riser baffles to maintain a substantially constant cross-section for flow through stripping zone 39.

Actually, single baffles such as Krug's 77 and 75, fixed in sequence in a row, are commonly used in stripping chambers in FCC units in order to promote good catalyst/steam contacting. In contrast, the apparatus of Claim 1 employs an arrangement of at least two pairs of segmented, parallel baffles in sequence spaced along in the stripping chamber.

Hedrick '221 does not cure the deficiencies of Krug noted above. Instead, the examiner relies upon Hedrick '221 for an alleged teaching of segmented baffles. The examiner asserts that it would have been obvious to have segmented baffles as taught by Hedrick '221 in Krug's apparatus. Thus, even if, for the sake of argument, one of ordinary skill in the art would have been motivated to modify Krug by reference to Hedrick '221, as proposed by the examiner, the combination would not lead to the apparatus of Claim 1.

Haddad does not cure the deficiencies of Krug in view of Hedrick '221 noted above. Instead, the examiner relies upon Haddad for an alleged teaching of a grid/filter. The examiner asserts that it would have been obvious to have a grid/filter as taught by Haddad in Krug's apparatus. Thus, even if, for the sake of argument, one of ordinary skill in the art would have been motivated to modify Krug in view of Hedrick '221 by reference to Haddad, as proposed by the examiner, the combination would not lead to the apparatus of Claim 1.

For at least the foregoing reasons, Applicants request reconsideration and withdrawal of the present §103 rejection.

Further, the patentability of other embodiments falling within the scope of the present claims is separately argued as follows.

Embodiments of the claimed apparatus (*e.g.*, Claims 15 and 16) have segments (rips) in each baffle corresponding to a free area, in the range from 5% to 20% of the total cross sectional area of the stripping chamber. This free area combined with the dimension and distribution of the ribs, arranged in each pair of baffles, provide a reduced coalescence of the stripping fluid bubble while promoting the homogeneous flow vertically in the stripping apparatus.

Also, common baffles of any other geometry are equally possible. See the sentence bridging pages 10 and 11 of the specification. In these embodiments, the baffles are segmented and arranged in vertical rows, in the stripping chamber, in order to provide a catalyst downward moving direction, through the cross-sectional free area in the range of from 20% to 80% of the cross-sectional total area of the stripping chamber. Through the rips (segments), in range from 5% to 20% of the cross-sectional total area of the stripping chamber, only the stripping gas flows upwardly.

The rips (segments) may be offset (not aligned) relative to each other in each pair of baffles. Also, the rips in the second disk baffle (*e.g.*, 1a - upper cone shaped) may have larger widths, but smaller lengths, than the rips of the first (*e.g.*, 1b - lower cone shaped) parallel baffle in a pair. The same may be sought in each pair of wall baffles (2a, 2b - donut type): the second baffle may have rips with widths larger than the rips of the first wall baffle. See, for example, the embodiments of Claims 17-20. In case the row of baffles comprises more than two pairs of baffles, the same dimensions and arrangement may be repeated.

Thus, the rips in a baffle of each pair may be offset relative to the rips in the next baffle, as shown in FIGS. 1B and 1C.

Therefore, the segmented baffles may be so spatially arranged (in pairs of offset rips) that the catalyst flows homogeneously vertically and horizontally so as to prevent stagnation zones and to improve the distribution of the stripping fluid. Consequently, embodiments of the present processes for stripping hydrocarbons correspond to an increased inventory and residence time within a stripping chamber, with improved overall efficiency, by using embodiments of the present apparatuses.

Also, in embodiments of the present apparatus, no riser conduit enters the stripping apparatus in the center of the chamber. This renders it the best arrangement of pairs of disks baffles in the center of the stripping chamber in series with pairs of wall baffles spaced along the stripping chamber. Also, there is no annular in these chambers.

As for the teaching of Krug, the main improvement of his invention over the prior art is the addition of an annular catalyst disengaging riser baffle 51 for deflecting the mixture discharged from the outlet toward the wall of the vessel. See column 2 at lines 41-47. Next, the disengaged catalyst is directed to a stripping zone arranged in a lower portion of the disengaging vessel. In the stripping zone, the baffles arrangement means riser-supported ring baffles 79 and donut wall baffles 81, axially spaced apart along wall 80 of the stripper 39. See column 9 at lines 43-49.

Hedrick '221 teaches annular baffles, of flat disk type, only, fixed in a row all around a riser in a stripping zone. The embodiment provides sectors perforate and imperforate arranged in

an offsetting position among succeeding baffles in a row. At column 7, lines 43-45, one can read that all adjacent baffles sectors are spaced apart typically by consistent degrees and adjacent edges of adjacent baffle sectors define downcomers or downcomer sections. These baffles may include numerous circular openings or grating through which the catalyst falls as well as through the downcomer section defined by such arrangement of sectors. From column 9, lines 7-11, one can confirm this descending of catalyst through the openings, of typically as much as 60 wt% and the remainder descending through the downcomer sections.

Catalyst flowing through perforate sectors totally differs from present embodiments in which the catalyst particles flow through along the cross-sectional free area, while through the ribs only the stripping fluid flows upwardly.

Applicants would like to highlight column 10, lines 34-37, of Krug, where a required compromise between adequate open area to pass catalyst is pointed out. Also pointed out therein is adequate contacting of steam with catalyst to promote fluidization that enables the catalyst to flow. This is a basic principle for a stripping apparatus in a FCC unit.

Thus, in Hedrick, at column 9, lines 11-18, at least 35% of the area of the perforated section comprises openings large enough to allow the passage of catalyst particles and stripping medium therethrough and small enough to diminish formation of large gas bubbles underneath the baffle. On the other hand, the stripping fluid should ascend through the openings without significant hindrance.

Contrary to Hedrick, pairs of baffles of present embodiments are intentionally offset oriented, allowing the gaseous flow to meet an impinging surface able to break the stripping fluid

bubbles and therefore enhance the entrapped hydrocarbons recovery. See page 10, lines 5-8, of the specification.

Therefore, the combination of Krug's baffle geometry arranged on the outside of the riser conduit with Hedrick '221's perforate baffles also mounted around the riser in the stripping zone would never lead to present embodiments where segmented baffles are arranged in pairs in the center and in the wall chamber in an alternate sequence.

For all of the foregoing reasons, Applicants request reconsideration and withdrawal of the present §103 rejection.

IV. RESPONSE TO REJECTION UNDER 35 U.S.C. § 103

Referring to Section No. 6 at pages 7 and 8 of the Office Action, Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Krug in view of Hedrick '221 and Haddad, and further in view of U.S. Application Publication No. 2002/0094313 ("Lu").

Applicants respectfully traverse.

Claim 2 depends from Claim 1. Therefore, the combination of Krug in view of Hedrick '221 and Haddad fails to teach or suggest the subject matter of Claim 2, for the same reasons as noted at Section III above. Further, Lu does not cure the deficiencies of the combination of Krug in view of Hedrick '221 and Haddad. Instead, the examiner relies upon Lu for an alleged teaching of a pipe-grid for feeding the gaseous pre-stripping fluid located in the upper part of the stripper apparatus. The examiner asserts that it would have been obvious to include a pipe-grid for feeding the gaseous pre-stripping fluid located in the upper part of a stripper apparatus, as taught by Haddad, in Krug's apparatus. Thus, even if, for the sake of argument, one of ordinary

skill in the art would have been motivated to modify Krug in view of Hedrick '221 and Haddad by reference to Lu, as proposed by the examiner, the combination would not lead to the apparatus of Claim 2.

For the foregoing reason, Applicants request reconsideration and withdrawal of the present §103 rejection.

V. CONCLUSION

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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